

LBNL SAFETY REVIEW COMMITTEE

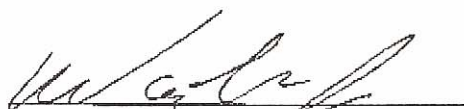
**Triennial Review of the
Management of Environment, Safety, and Health**

Physics Division

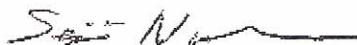
**December 2006
Report Issued: May 2007**



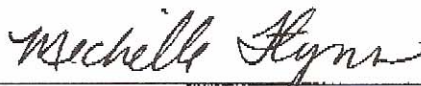
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LBNL Safety Review Committee
Review of the Physics Division
Management of Environment, Safety, and Health (MESH)

December 2006

A. Executive Summary

The Physics Division has a well established Environment, Safety and Health (ES&H) infrastructure to effectively manage safety in its work activities and operations. Staff demonstrates a strong commitment to ES&H, as evidenced by the Division's outstanding safety record. The Division Director is personally involved with ES&H issues and served as EH&S Coordinator while the Division reorganized its safety program. In response to renewed Lab-wide emphasis on line-management responsibility for safety, the Division systematized quarterly safety reviews and workspace inspections. The Division has a particularly effective system for work planning and hazard evaluation and recognizes employees' good ES&H practices in performance reviews.

Since its last MESH review in 2003, the Division made several refinements to ensure it maintains a robust system for implementing Integrated Safety Management. Prompted in part by retirement of its veteran ES&H Coordinator, Physics designed and implemented a comprehensive reorganization of EH&S in the Division. The main improvements of the reorganization are: increased safety responsibilities of line managers (Group Leaders); developed a full set of instructions, checklists and forms to aid the Group Leaders in the fulfillment of their safety responsibilities; and enhanced safety support oversight of the Corrective Action Tracking System (CATS), EH&S Training, Ergonomics and Hazards Equipment, Authorizations, Reviews (HEAR) databases.

This Physics Division review notes four noteworthy practices, three observations and one concern. One observation of an institutional process is also noted.

B. Description of Division

The Physics Division's principal activity is research in theoretical and experimental high energy physics aimed at understanding the basic forces and constituents of matter. This activity incorporates the development of sophisticated detectors to carry out that research. The Physics Division also includes a program in high energy astrophysics and the activities of the Particle Data Group, whose compilation and evaluation of particle physics data serves the worldwide high energy physics community. A large group in the Physics Division is participating to the ATLAS experiment at the Large Hadron Collider (LHC) at CERN (Geneva, Switzerland), to study the origin of mass at the electroweak scale, top quark decays and supersymmetry. The Division also offers opportunities for graduate training and sponsors summer undergraduate programs. The Physics Division participates in collaborative projects with industry to advance

the state of the art and improve performance of equipment. The Division conducts work at the LBNL site, at other national laboratories or international facilities. The MESH review focused on the LBNL site activities; the activities at other DOE and offsite facilities are beyond the scope of the MESH program.

Physics currently has approximately 145 career and term employees. These include 26 active faculty members, 22 senior staff, 12 staff scientists and 12 administrative staff. Non-career employees include 20 post docs, 25 graduate student research assistants (GSRAs) and 5 student assistants. The Physics Division has approximately 20 technical staff, including those matrixed from other divisions. There are about 165 short- and long-term guests. Physics conducts onsite work primarily in facilities in B50, B50A, B50B and B70A.

Hazards present in the Division include work with toxic and explosive gases, sealed radioactive sources, machine tools, flammable gases, cryogenics and electrical and mechanical hazards. Most common to Physics Division employees is the ergonomics hazard associated with computer work. The Division encourages all employees to have workstation evaluations and acquires the proper chairs and accessories. The Physics Division maintains two Activity Hazard Documents, three Sealed Source Authorizations, and two Low-Activity Source Authorizations.

The Division has an ES&H Coordinator and Safety Committee to assist in the planning and review of work and associated safety concerns within the Division. The Coordinator is the programmatic lead for ES&H and has the responsibility to develop policies and procedures, manage the Division self-assessment process, develop the ES&H budget, serve as the primary ES&H communication path within the Division, and chair the Safety Committee. The Division Safety Committee meets monthly and identifies ES&H needs for policy, procedure, equipment and training, performs project reviews for all division work projects, participates in self-assessment activity and root cause analysis, communicates ES&H issues to staff and provides expert in-house advice on ES&H. The Division ISM Plan commits the following resources to ES&H:

- 0.50 FTE, ES&H Coordinator
- 0.25 FTE, Safety Support
- 0.05 – 0.10 FTE, ES&H committee activities
- 0.05 – 0.10 FTE, self-assessment activities
- 0.05 FTE, hands-on safety activities by technical staff

C. Introduction: Description of the Appraisal Process

The objective of the MESH Review is to evaluate the Physics Division's management of ES&H in its operations and research, focusing on the implementation and effectiveness of the Division's Integrated Safety Management (ISM) Plan. It is a peer review that provides a strong perspective from the research and operations community on the state of ES&H in the Division.

The appraisal process included a review of the documentation provided by Physics, an opening meeting with representatives from Physics, staff interviews, and a walkthrough of staff

workspace. The MESH review team consisted of Ken Fletcher, team leader from Facilities Division, Wayne Lukens from Chemical Sciences Division, Seiji Nakagawa from Earth Sciences Division, and Michelle Flynn from the Office of Contract Assurance.

The MESH team met with Physics staff on December 7, 2006. Division Director James Siegrist and retired ES&H Coordinator Kathie Hardy met with the MESH team and discussed the Division's safety programs. In addition to these individuals, the team interviewed Richard Kuiper and Nick Palaio, and engaged in informal dialog with division staff during tours of spaces. The team toured the Physics machine shop in Building 50 and visited the Microsystems Laboratory in Building 70A.

D. Results of the MESH Appraisal

The appraisal results are organized by areas of inquiry from the MESH questionnaire, which follows the core functions of Integrated Safety Management. Findings are broken into three categories:

Noteworthy practices – practices or conditions that are recognized for their excellence and should be considered for Lab-wide application.

Observations – observations indicate room for improvement. They may be practices or conditions that are not necessarily out of compliance, but could lead to non-compliance if unaddressed. Observations may also reflect practices that, with some additional level of effort, could achieve noteworthy practice status.

Concerns – clear cases of practices or conditions that do not comply with regulations or LBNL policy, and/or indicate inadequate management systems within the division. Concerns are deficiencies and must be corrected.

1. Work Planning

The Physics Division has a mature and comprehensive safety management program. The ES&H Coordinator meets weekly with the Division Director who passes information to the Group Heads and Leaders. Groups discuss ES&H topics at regularly held meetings, and the Division disseminates ES&H information via Level-1 e-mails and the Division's safety website. Physics holds an annual All-Hands meeting devoted to ES&H issues and conducts special student safety meetings at least once per year.

1.1 2006 MESH Results

Noteworthy Practice: The Division recently changed the roles and responsibilities of the Group Leaders and the ES&H Coordinator. Previously, the ES&H Coordinator was responsible for many of the safety obligations usually assigned to principal investigators.

Greater responsibility now rests on line management and less so on the ES&H Coordinator. This is a positive change in that the safety responsibilities now rest with line management.

Observation: The Physics Division ISM plan appears to assign responsibilities for the Group Leaders and the Division Safety Coordinator slightly different from PUB300. This is the prerogative of the division but may cause some confusion during safety reviews.

1.2 Corrective Action Status – 2003 MESH

2003 MESH Concern: *The Physics Division has not adequately addressed and closed out the concerns identified in previous reviews, including the FY2000 MESH review. The concerns raised in the FY2000 review are still current and are addressed in other sections of this review.*

Status: Over the last two years (FY2005 and FY2006), Physics steadily improved its responsiveness in addressing programmatic opportunities for improvement. The only recurring concern identified in this 2006 MESH review is the low completion rate for required ES&H training (noted as a Concern in Section 3.1).

2003 MESH Concern: *The Division is not using its procedures and systems to the fullest extent to manage ES&H within the Division. Stated procedures or plans to review projects, evaluate ergonomic concerns, correct workplace deficiencies, and train personnel can be improved to provide consistent safety documentation to Division and Lab management. Reports and data on these issues are not provided in a timely manner and/or are incomplete (e.g. do not cover all Division operations).*

Status: The Physics Division has increased the utilization of the systems and procedures available. Physics has added oversight by the ES&H Committee and increased supervisory participation in managing input to EH&S databases.

2003 MESH Observation: *The FY2000 MESH review recommended that a member from the Microsystems Lab (MSL) be on the Physics ES&H Committee because the unit is not only one of the higher hazard facilities of the Division but it also has an excellent safety program. Physics has chosen not to have a member of the MSL on the committee.*

Status: The MSL manager is a re-instated member of the Physics ES&H Committee.

2. Hazard Identification and Risk Analysis

The Physics Division has a long established process for hazard identification. The Project Leader or Lab manager for each new or revised project completes a Project Safety Review Questionnaire (PSRQ) describing both administrative and engineering controls. The ES&H Coordinator and ES&H Committee review PSRQs and are responsible for project approval. EH&S Division subject matter experts and the EH&S Division Liaison are often included in the process.

2.1 2006 MESH Results

Noteworthy Practice: The project review process is commendable. The ES&H Coordinator and ES&H Committee review all Project/Facility Safety Review Questionnaires for new work and existing work with changes in scope. In response to the 2003 MESH review, the Division reinstated the annual submission and review of the questionnaire, adding formality to the periodic review of work with no change in scope. All work within the Division undergoes this annual review. The ES&H Coordinator and ES&H Committee also review formal EH&S work authorizations before they are finalized and often include the EH&S Division Liaison and other EH&S Division subject matter experts in the reviews. The committee consists of members who represent the breadth of Physics, which is vital for assessing ES&H issues from all parts of the Division.

Institutional Observation: Guests and students begin work at LBNL without a pre-placement medical evaluation. This may result in unnecessary liability for the Lab if those individuals have preexisting ergonomic-related problems.

2.2 Corrective Action Status – 2003 MESH

2003 MESH Concern: *The annual Project Review (cf. Physics ISM Plan) of the existing projects in the Division is informal and lacks sufficient rigor. The Division has stated that if a project has not changed, only a verbal validation by the ES&H Coordinator is conducted. Even if many of Physics' research projects have no changes to personnel, equipment, hazardous materials used, or work procedures for years, a documented review to affirm no changes may still be worthwhile. The informality and lack of rigor of Physics' hazard reviews were also identified in the last MESH review and in the IFA.*

Status: In response to this concern, Physics reinstated annual submissions of the PSRQ. The ES&H Coordinator and ES&H Committee review PSRQs and are responsible for project approvals.

2003 MESH Concern: *The Division had expressed three years ago a concern for ergonomic injuries from heavy computer use and certain laboratory activities and stated a goal of evaluating all Division workstations with at-risk activities. Since then, the number of evaluations performed appears to be low relative to the at-risk population (per the LBNL ergonomic evaluation database).*

Status: The Physics Division recognizes ergonomics as a major safety concern and conducts special training sessions targeting specific groups of staff. The Division orders ergonomic evaluations immediately for anyone expressing discomfort. During self-assessment performance year 2006, the Division requested 58 ergonomic evaluations for staff, as compared to 10 requests in performance year 2003. Results of the vertical slice conducted in May 2006 indicate the Division needs to continue, and increase, its emphasis on ergonomics.

3. Establishment of Controls

Currently the Division has two Activity Hazard Documents (AHDs), three Sealed Source Authorizations and two Low-Activity Source Authorizations. These formal authorizations were reviewed and approved by the Physics and EH&S Divisions within the past year. For other Division projects, hazard identification and risk analysis are done through the Division's Project Safety Review Questionnaire (PSRQ). The PSRQ identifies the type of hazards involved in the project, the location of the work, need for an AHD, training requirements and controls contemplated. The completed PSRQ is the basis for the annual review of the project by the ES&H Coordinator and the ES&H Committee.

The MSL and machine shop appeared clean and orderly. The heads of those operations have a thorough understanding of the ES&H systems and controls required by the Division.

3.1 2006 MESH Results

Observation: Ergonomic issues appear somewhat intractable towards correction. However, employees should be made aware that stands and separate keyboards are available for laptops, which mitigate some of the ergonomic issues associated with laptop computer use. This is potentially a site wide problem.

Interviews indicate that students and post docs are more likely to suffer ergonomic injuries, due to hesitancy in reporting discomfort.

Observation: Access to the MSL is controlled by electronic card key. The head of the MSL infrequently reviews access to the facility. The Division should periodically verify who has access to the lab and for what purpose.

Concern: The ongoing issue with deficient training rates has not been resolved. In some cases, basic EH&S training (e.g. General Employee Radiation Training) has not been completed. In many cases, employees have completed Job Hazards Questionnaires (JHQs) incorrectly prompting unneeded, and consequently unfulfilled, training requirements. It is the responsibility of the employees' supervisor to insure that the JHQs are correctly completed and that employees take required training.

3.2 Corrective Action Status – 2003 MESH

2003 MESH Concern: *Although the Division has a relatively stable population, the completion rate for required ES&H training is relatively low. In the past, the Division believed that the low rates were primarily due to a data entry problem. However, since this was first identified in the FY2000 MESH review, the rates continue to be in the low 80's percent range.*

Status: Following the FY2003 MESH review, Physics improved its completion rate for required ES&H training, achieving 90% in performance year 2004. However, the Division's

completion rate declined since that time, with rates of 86% in performance year 2005 and 83% in 2006. Verification of training completion is an item on the new Physics Division EH&S Quarterly Report for Group Leaders, which may improve senior division management's ability to address training deficiencies in a more timely manner.

2003 MESH Concern: *Ergonomics training for heavy computer users or other at-risk personnel is still at a low completion rate per the EH&S training database. Although ergonomics was identified by the Division as one of its most prominent ES&H issues, completion of ergonomics training by a greater number of Physics' at-risk population is still needed.*

Status: The Physics Division recognizes ergonomics as a major safety concern. Its completion rate for EHS060, Ergonomic Awareness for Computer Users, was approximately 80% in performance year 2006. While the division has held special training sessions targeted for specific groups of staff, it relies on evaluation and interaction (ESH0068 Ergonomic Workstation Evaluations) rather than on formal classroom training. Evaluations are ordered immediately for anyone expressing discomfort.

4. Work Performance

The Physics Division has an excellent record for performing work within authorizations or within the Division safety envelope. For the past 8 years, there have been no Nonconformance Corrective Action Reports or Quality Assurance exceptions for waste management and no major findings for radiation protection. Satellite accumulation areas were inspected at 100% compliance for the past 8 years. There were no recordable injuries/accidents in fiscal years 2004 and 2005, and only one recordable injury in fiscal year 2006.

4.1 2006 MESH Results

Noteworthy Practice: Performance of work within established controls has resulted in the Physics Division's excellent safety record of low injury/accident rates and no adverse ES&H events in the last 13 years.

5. Feedback and Improvement

Senior and line management is directly involved in the division self-assessment program and have historically participated in self-assessment teams. Over the last year, Physics developed more detailed expectations for conducting ES&H-related activities in the division. Group Leaders are now expected to submit quarterly reports as verification of walk-arounds, staff JHQ and training completion, safety communication, and identification of hazardous situations. The system fosters more consistent PI oversight and follow-through on ES&H matters. Group Leader responsibilities are located on the Documents page of the Physics Division EH&S website.

Physics periodically conducts a vertical slice review to determine the level of awareness and knowledge of Laboratory and Division-specific ES&H information. This self-initiated review includes interviews of GSRAs, students, guests, employees and group leaders.

5.1 2006 MESH Results

Noteworthy Practice: The vertical slice review is an excellent tool to assess strengths and weakness in the Division's safety program. The 2006 vertical slice did identify opportunities for improvement, and the Division has corrective actions underway to address those areas in 2007.

5.2 Corrective Action Status – 2003 MESH

2003 MESH Concern: *The Division is still not adequately tracking and closing out its corrective actions in the Laboratory's corrective action tracking system, LCATS, or other equivalent system. The lack of tracking corrective actions has been a continuous problem identified in self-assessment reports for the past several years.*

Status: Physics has improved its process for tracking and closing out corrective actions. Researchers now enter findings directly into CATS and are responsible for follow-up. The Division ES&H Coordinator or EH&S Liaison monitor CATS to ensure safety deficiencies are corrected in a timely manner. Physics completed 100% of corrective actions on time during performance year 2006 (July 1, 2005 to June 30, 2006).

2003 MESH Observation: *Documentation of inspections is limited. The Division does not have organized records of inspection locations, dates, and names of the inspectors. Because of the lack of information, the MESH team was unable to determine which facilities were inspected or the scope of those inspections.*

Status: The Physics Division developed a new system for inspections, which includes more formalized documentation of results and required quarterly reporting by line managers.